



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,790	02/24/2004	Masaaki Iijima	Q78714	2176
23373	7590	09/09/2005		
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER VERDIER, CHRISTOPHER M	
			ART UNIT	PAPER NUMBER
			3745	

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/784,790

Applicant(s)

IIJIMA ET AL.

Examiner

Christopher Verdier

Art Unit

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5 is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 3745

Applicants' amendment dated June 27, 2005 has been carefully considered but is deemed non-persuasive. Claims 1-6 are pending. The abstract has been amended to correct the informality set forth in the first Office action. The specification has been amended to correct the informality set forth in the first Office action. Correction of the above matters is noted with appreciation.

With regard to the rejection of claims 1-3 and 6 under 35 U.S.C. 103(a) as being unpatentable over Ito 5,407,318 in view of Kato 5,372,475, Applicants have argued that the primary reference to Ito has a front face that is curved, which leads to significant structural disadvantages, in particular the susceptibility of the pointed tip end of the vane to break or crack, and that this disadvantage was first noted by Applicants and not by either Ito or Kato. Applicants have further argued that the instant application solves this problem by applying a chamfer to a pointed tip end without a sacrifice of efficiency. Applicants have further argued that the inventive aspect of the instant application is a combination of structural features and not simply the addition of the single feature of the chamfer, and that simply adding such a chamfer to the impeller of Ito is not obvious. Applicants have further argued that there is no teaching or suggestion in Kato, either by way of solving a common problem or by achieving a common goal, that would lead to the proposed modification of Ito. Applicants have further argued that the additional chamfer on the front face of the vane of Kato which is located on a forward side in the rotational direction of the impeller is merely provided to produce an asymmetrical design, such that the impeller can be assembled to the pump housing without any visual check in the rotational direction, and that Kato does not teach or suggest any influence on pump efficiency

Art Unit: 3745

which is caused due to size of the chamfer on the front face of the vane. These arguments are not persuasive, because it has been held that it does not matter that a reference does not solve the same problem that the claimed invention is solving or that the suggestion for combining the prior art is to achieve an end or purpose different from that which the applicants may have had in mind. *In re Beattie*, 974 F.2d 1309, 24 USPQ2d 1040 (Fed. Cir. 1992); *In re Dillon*, 919 F.2d 688, 16USPQ2d 1897 (Fed. Cir. 1990); *In re Wiseman*, 596 F.2d 1019, 201USPQ 658 (CCPA 1979). So long as there is a valid basis in the reference teachings themselves for the combination, a conclusion of obviousness grounded on that basis is appropriate. Kato teaches that impeller vanes 323 are formed as generally rectangular plates and each having a chamfer portion 3231b disposed between a tip end face 3230 and an unnumbered tip end portion of a front face (unnumbered, but the leading edge of the vane as seen in the direction of rotation of the impeller), for the purpose of reducing the loss of vortex fuel currents, thus raising pump efficiency. This motivation is expressly articulated in column 16, lines 61-66 of Kato.

Applicants have also argued that Kato teaches away from the claimed invention because the vane structure in figures 18 and 19 is derived by shaving away a rectangular corner of the vane without achieving any structural advantage and that removal of the material would tend to weaken the structure and make it more susceptible to cracking and breakage, and that one skilled in the art would not tend to remove material of Ito in the manner taught by Kato, if the goal was to greater stability and resistance to cracking and breaking. These arguments are not persuasive, because the impeller of Kato is disclosed as being made of resin, which is the same material as the impeller of Applicants, and therefore would not be susceptible to increased breakage or

Art Unit: 3745

cracking. With regard to the argument that Kato does not achieve any structural advantage, this is not persuasive because the arrangement of Kato achieves reducing the loss of vortex fuel currents, thus raising pump efficiency. As set forth above, the purpose for the combination of Ito and Kato is for reducing loss of vortex fuel currents to raise pump efficiency, not to greater stability and resistance to cracking and breaking.

With regard to Applicants' argument that the justification for the combination of Ito and Kato relies on hindsight and that there is no teaching in either reference that the addition of a chamfer to the edge would raise fuel efficiency or reduce loss of vortex fuel, and that this is based solely on the examiner's reference to Applicants' teachings, these arguments are not persuasive. As set forth above, Kato teaches that impeller vanes 323 are chamfered at portion 3231b for the purpose of reducing the loss of vortex fuel currents, thus raising pump efficiency. This motivation is expressly articulated in column 16, lines 61-66 of Kato. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The purpose for the combination of Ito and Kato is expressly articulated in column 16, lines 61-66 of Kato, and does not include knowledge gleaned only from the applicant's disclosure.

Art Unit: 3745

Applicants have argued concerning the rejection of claim 4 under 35 U.S.C. 103(a) as being unpatentable over Ito 5,407,318 and Kato 5,372,475 as applied to claim 3 above, and further in view of Yu 5,762,469, that Yu does not remedy the deficiencies of Ito and Kato, and that there is no teaching that would lead one skilled in the art to modify the tip end of the curved vane of Ito with a chamfer as claimed. This argument is not persuasive for the reasons set forth above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito 5,407,318 in view of Kato 5,372,475. Ito (figures 2-8) discloses a turbine fuel pump substantially as claimed, including a cylindrical casing 23, an electric motor 25 accommodated in the casing, a pump housing 26 mounted into the casing, the pump housing including a suction port 35, a discharge port 36 and a fuel path connected to the suction and discharge ports, and an impeller 28 disposed within the pump housing and driven around an axis in a rotational direction R by the electric motor, the impeller including a generally annular body and a plurality of vanes 39 projecting radially outwardly from the body and disposed within the fuel path, each of the vanes being formed into a generally rectangular plate including a tip end face 39c that extends circumferentially to define an outer peripheral surface of the impeller, a front face 39a located on a forward side in the rotational direction of the impeller and having a root portion (at the radially inner periphery of 39a) located on a side of the body of the impeller and a tip end portion (at the radially outer periphery of 39a) located on a side of an outer periphery of the impeller, the front face being curved such that the tip end portion is positioned forwardly in the rotational direction R of the impeller relative to the root portion, and a rear face 39b located on a rearward side in the rotational direction of the impeller.

However, Ito does not disclose a chamfer portion disposed between the tip end face and the tip end portion of the front face, with the chamfer being formed as a cut corner between the tip end face and the tip end portion of the front face, with the chamfer portion having a uniform length between the tip end face and the tip end portion of the front face as measured in section

Art Unit: 3745

perpendicular to the axis, with the chamfer portion being inclined relative to a plane containing the axis.

Kato (figures 18-19) shows a turbine fuel pump having an impeller with vanes 323 formed as generally rectangular plates and each having a chamfer portion 3231b disposed between a tip end face 3230 and an unnumbered tip end portion of a front face (unnumbered, but the leading edge of the vane as seen in the direction of rotation of the impeller), with the chamfer being formed as a cut corner between the tip end face and the tip end portion of the front face, with the chamfer portion having a uniform length between the tip end face and the tip end portion of the front face as measured in section perpendicular to a rotation axis, with the chamfer portion being inclined relative to a plane containing the axis, for the purpose of reducing the loss of vortex fuel currents, thus raising pump efficiency.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine fuel pump of Ito such that a chamfer portion is disposed between the tip end face and the tip end portion of the front face, with the chamfer being formed as a cut corner between the tip end face and the tip end portion of the front face, with the chamfer portion having a uniform length between the tip end face and the tip end portion of the front face as measured in section perpendicular to the axis, with the chamfer portion being inclined relative to a plane containing the axis, as taught by Kato, for the purpose of reducing the loss of vortex fuel currents, thus raising pump efficiency.

Art Unit: 3745

Although the vanes of Kato are not formed such that the tip end portion is positioned forwardly in the rotational direction of the impeller relative to the root portion, one of ordinary skill in the art would have recognized that the teachings of Kato of chamfering the tip portion are applicable to both straight and curved vanes, since the chamfering solves the problem of reducing the loss of vortex fuel currents, which is present in turbine pumps having both straight and curved vanes.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ito 5,407,318 and Kato 5,372,475 as applied to claim 3 above, and further in view of Yu 5,762,469. The modified turbine fuel pump of Ito shows all of the claimed subject matter except for the uniform length of the chamfer portion being in the range of 0.05 to 0.15mm.

Yu (figures 2-3) teaches that a turbine fuel pump may have impeller vanes 54 with a chamfered tip portion 70 that has a distance d of 0.1-0.6 mm, and an angle θ of 5-30 degrees. Forming a right triangle, the length of the chamfered portion is $(0.1-0.6)/\cos(5-30 \text{ degrees})$. The length of the chamfered portion, for example, is $0.1/\cos 30 \text{ degrees}$, which is 0.115mm, as a value which one would consider to reduce turbulence and cavitation.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified turbine fuel pump of Ito such that the uniform length of the chamfer portion is 0.115mm, as taught by Yu as a value which one would consider to reduce turbulence and cavitation.

Although the vanes of Yu are not formed such that the tip end portion is positioned forwardly in the rotational direction of the impeller relative to the root portion, one of ordinary skill in the art would have recognized that the teachings of Yu of the length of the chamfered tip portion are applicable to both straight and curved vanes, since the chamfering solves the problem of reducing turbulence and cavitation, which is present in turbine pumps having both straight and curved vanes.

Allowable Subject Matter

Claim 5 is allowed.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

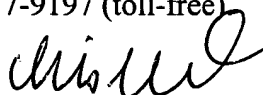
Art Unit: 3745

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
September 1, 2005


Christopher Verdier
Primary Examiner
Art Unit 3745